EDITORIAL

Impact factor and study quality

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Impact factor (IF) – an index of citations of articles in the 2 years subsequent to publication in a journal[1] – is a measure used for ranking journal quality.[2] It is also an important issue for authors to consider when selecting journals for manuscript submission[1]: those with higher IFs are often considered more prestigious. The values of IF vary widely between journals. While a few journals have very high IFs (*CA: A Cancer Journal for Clinicians*, IF 101.78 in 2011; *The New England Journal of Medicine,* 53.298; and the *Annual Review of Immunology*, 52.761),[3] most have IFs between 1 and 2, and many have IFs well under 1.[4] A journal of IF over 4 is often considered of good quality.[4]

IF is sometimes used for evaluating the quality of individual articles and researchers. However, the fact that 50% of the articles that are most cited in a journal often account for 90% of a journal's IF suggests that a journal's IF is unlikely to represent the quality of individual articles or researchers.[2] This approach has received criticism.[2]

Several empirical studies have examined the issue about the quality of journal publications and their IFs. Most of them compared methodological characteristics of randomized controlled trials (RCTs) published in higher vs. lower impact journals. Some of these studies revealed differences in the two journal categories: higher impact journals more likely publish RCTs of larger sample sizes, better methodological quality,[5,6] increased probability of publishing positive RCTs,[7] and with more frequent reporting of statistical information (for example, effect size, precision, sample size, and power calculations).[8]

A recent systematic survey examined methodological characteristics of a large sample of RCTs published in higher vs. lower impact journals.[9] This survey covered a broad range of RCTs published in the Core Clinical Journals in 2007, which was defined by the National Library of Medicine. The group of higher impact journals included the *Annals of Internal Medicine*, *British Medical Journal*, *Journal of the American Medical Association*, *Lancet*, and *The New England Journal of Medicine*. This study found that trials in higher impact journals enrolled more participants and were more likely to receive industry funding. The reporting of information regarding methodological quality, although better in higher impact journals, was insufficient in both groups of journals. For instance, allocation concealment was not reported in 34% of the trials in higher impact journals, and the proportion was even higher (64%) in lower impact journals, while failure to conceal treatment allocation is associated with bias.[10]

This study also found that trials often used surrogate markers, rather than patient-important outcomes, for the assessment of treatment effects, as the effect may be more apparent in the use of surrogate outcomes. However, treatment effects on patient-important outcomes may be small and uncertain even with large effects on surrogate markers.[11] Previous studies have shown that only a small proportion of trials (11% to 23%) reported patient-important primary outcomes.[12,13] This study further found that patient-important primary outcomes appeared to be more commonly reported in higher vs. lower impact journals (69% vs. 50%)[9], and continuous outcomes were more common in lower impact journals, likely as a result of using surrogate markers of clinical events.

The *Polish Archives of Internal Medicine* (Pol Arch Med Wewn) received its first IF of 1.367 in June 2012, placing the journal on the ninth place of 37 Polish biomedical journals with an IF. This is considered a great success of the journal and the Polish Society of Internal Medicine.[14] One may ask: are the findings from previous studies applicable to this journal? In an effort to critically appraise the quality of trials in the Pol Arch Med Wewn, we searched for RCTs published in the past 2 years and found only 2 trials.[15,16] Sample sizes

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of these 2 trials were small (n = 33) or moderate (n = 260). Only one of those studies reported the source of funding.[16] None of the studies reported information regarding randomization and treatment concealment of allocation, making the judgment about the validity of randomization impossible. Blinding was not applied to the parties involved in the 2 trials (e.g., care providers, patients) except outcome assessors in 1 trial.[16] None of the studies reported information regarding the completeness of follow-up, and patient-important outcome was reported in 1 trial.[16] Generally, the methodological quality of the 2 trials appeared suboptimal and the validity of effect estimates may be questionable. Despite the small number of observations, the findings signal that problems mentioned in the previous studies is probably applicable to the trials published in the Pol Arch Med Wewn.

We also found that the vast majority of publications in this journal were nonrandomized studies. Of the 87 original articles published in the past 2 years, 82 were nonrandomized studies, predominantly observational studies. Previous studies have shown that lower impact journals, compared with higher impact journals, published fewer RCTs but more observational studies[7]; RCTs constituted 12% and 35% of the published studies, respectively.[8] It seems that the Pol Arch Med Wewn publishes even a higher proportion of observational studies than that observed in previous reviews. For journals from lower income countries such as Poland, expensive RCTs are probably uncommon. As a result, the publication of RCTs may be reasonably less frequent in such journals. However, the inherent limitations of nonrandomized studies (e.g., inability to randomly allocate patients to control unknown confounding factors) pose more serious threats to the validity of results.[17]

What do these findings imply? First, all the above findings suggest that there are important methodological limitations in RCTs published both in higher and lower impact journals, although those published in higher impact journals may have relatively better methodological quality. An RCT published in higher impact journal may not guarantee the credibility of the results. Moreover, readers should appropriately assess the credibility of the results and cautiously apply findings from RCTs published both in higher and lower impact journals. Researchers should design and conduct studies more rigorously, and report the results in more detail, regardless of RCTs and nonrandomized studies. Editors should always consider the improvement of the quality of a publication as a top priority. Finally, authors should look beyond a journal's impact factor in the selection of target journals.

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